What is claimed is:

1. An apparatus for removing semiconductor wafers from within the runner disks in a double-sided polishing machine, comprising:

a suction head (52) adapted to be connected to a vacuum, which has a plurality of suction ports (60, 61) such that all semiconductor wafers (26) received by a runner disk (24) may be gripped simultaneously;

an arm (50) on which the suction head (52) is rotatably supported about a vertical axis and which, in turn, is pivotally supported about a vertical axis at a spacing from the suction head or is supported so as to be linearly adjustable or adjustable in height;

a rotary drive (52') for the suction head (52), a drive (30) for the arm (52), a lifting drive for the arm (52), and

a control device for activating the drives such that the semiconductor wafers (26) may be deposited on a lay-down device (74) in a predetermined, aligned position.

2. The apparatus according to claim 1, characterized in that the runner disks (24) have a mark (64), the suction head (52) has a sensor (70) for detecting the mark (64) and the control device, while rotating the suction head (52), moves it to a predetermined rotational position relative to the runner disk (24).

3. The apparatus according to claim 1, characterized in that the mark (64) is a deepened point, especially a bore.

4. The apparatus according to claim 1, characterized in that the suction head (52) has two suction cups (60, 61) for each semiconductor wafer (26) which lie on a radius of the semiconductor wafer (26) when the suction head (52) is aligned towards a runner disk (24).

5. The apparatus according to claim 4, characterized in that one suction cup (61) is aligned towards the centre of the respective semiconductor wafer (26).

6. The apparatus according to claim 1, characterized in that the lay-down device (72) has a circular plate (74) adapted to be driven by a rotary drive which is subdivided into three sectors (76, 76a) wherein each sector (76, 76a) has at least one nest (78, 78a) to receive a semiconductor wafer and is supported so as to be tiltable about a horizontal axis and one sector (76, 76a) each is adapted to be aligned towards a transfer portion (82, 98) leading to a cassette.

7. The apparatus according to claim 1, characterized in that immersion baths (80) for the suction cups (60, 61) of the suction head (52) are arranged in the nests (78, 78a).

8. The apparatus according to claim 1, characterized in that the arm (50) is mounted on a carriage (46) which is held on a carrier element (38) having a linear guide (44) so as to be guided vertically and that the carrier element (38) is rotatably supported on the machine frame (10, 28).

9. The apparatus according to claim 1, characterized in that the arm (50) is pivotally supported about a vertical axis on a bearing component (28a) and is driven by a swivel drive and that the bearing component (28a) is movably supported along a linear guide (100) which is arranged between the polishing machine and a second polishing machine and that the bearing component (28a) is adapted to be displaced by an actuator drive along the guide (100).

10. The apparatus according to claim 9, characterized in that the upper polishing disks of the two polishing machines are pivotally supported about a vertical axis towards opposed sides.